

## **REMARKS/ARGUMENTS**

### **Claim Amendments**

By the claim amendments presented, Claims 1-7 are rewritten to characterize the claimed esters as comprising a "composition" which, can include "mixtures of esters". Support for these amendments to Claims 1-7 can be found in Paragraphs [0003], [0025] and [0041] of the published version (U.S. 2006/0223925) of the originally filed specification.

Also by the claim amendments presented, Claim 1 is further rewritten to indicate that the toluate reactant used in producing the claimed reaction product composition is the "methyl-*p*-toluate enriched stream of a Witten dimethyl terephthalate process". Support for this amendment to Claim 1 is found in Paragraph [0025] of the published version of the originally filed specification and in originally filed Claim 4.

Also by the claim amendments presented, Claim 1 is still further rewritten to indicate that the claimed composition has a viscosity of less than about 0.35 pascal second at 25 °C. Support for this amendment to Claim 1 is found in the originally filed specification in Paragraph [0026] of the published version of the specification and in originally filed Claim 3. As a consequence of this Claim 1 amendment, Claim 2 is rewritten to delete the viscosity element therefrom, and Claim 3 is rewritten to recite a preferred value for composition viscosity as taught in Paragraph [0026] of the published version of the original specification.

Also by the claim amendments presented, Claims 4 and 5 are rewritten to further describe the make-up of the methyl-*p*-toluate enriched stream used to prepare the claimed compositions. Support for such amendments to Claims 4 and 5 is found in TABLE I in Paragraph [0030] of the published version of the originally filed specification.

Also by the claim amendments presented, original Claims 5-25 are cancelled without prejudice.

Also by the claim amendments presented, new Claims 26-28 are added to the claim set. These new claims are directed to alternative and preferred embodiments of the toluate ester compositions herein. Basis for these new Claims 26-28 can be found

in Paragraphs [0022] and [0030] of the published version of the originally filed specification and in original Claims 1, 6 and 7.

Upon entry of the claim amendments presented, Claims 1 - 7 and 26 - 28 remain in the application. No additional claims fee is due as a result of these claim amendments.

### **Invention Synopsis**

The present invention as now claimed is directed to toluate based ester compositions useful as a plasticizers, extenders, or diluents in polymer formulations. Such compositions comprise mono- or di-esters or a mixture of esters. These esters are prepared from the reaction of C<sub>2</sub>-C<sub>6</sub> diols, such as diethylene glycol and triethylene glycol, with a certain type of methyl-*p*-toluate enriched reactant stream. This methyl-*p*-toluate enriched stream can contain components such dimethyl terephthalate, methyl-*p*-formyl benzoate, *p*-toluic acid and methyl benzoate in addition to the primary reactant methyl-*p*-toluate. Such a stream can conveniently be provided as part of the Witten process for the preparation of dimethyl terephthalate. The ester compositions which result from the reaction of these two types of materials are liquid compositions of low volatility and have a viscosity of less than 0.35 pascal second at 25 °C.

The toluate ester based compositions of this invention can be used as is or can be combined with extenders such as tall oils or modified tall oils or natural vegetable oils. The resulting compositions find use as low volatility extenders, diluents and solvents for polymers such as polyvinyl chloride and phenolic resins.

### **Restriction Requirement**

In the instant Office Action, the previously applied restriction requirement has now been made FINAL. Accordingly, the previously withdrawn, non-elected claims 8-25 are cancelled herein without prejudice. Applicant expressly preserves her right to pursue such cancelled, non-elected claims via one or more divisional applications.

### **Formal Matters**

Claims 1-7 have been rejected under 35 U.S.C. §112, Second Paragraph, as allegedly being indefinite for including "other aliphatic diols" in the recitation of the glycol/diol reactants used to prepare the claimed ester compositions. By the claim amendments presented herein, Claim 1 has been amended to eliminate this phrase. It is submitted that this Claim 1 amendment serves to obviate the presently applied Section 112 rejection.

### **Art Rejections**

#### **Section 102 Rejection**

Claims 1-5 have been rejected under 35 U.S.C. §102(b) as allegedly being directly anticipated by Arendt et al (U.S. Patent No. 5,990,214, hereinafter "Arendt"). The Examiner contends that the Arendt general disclosure of diethylene glycol and triethylene glycol esters of benzoic or toluic acid teach ester compositions of applicants' claimed component makeup and would inherently have the low viscosity and low volatility characteristics of applicant's claimed ester compositions. Such a rejection is respectfully traversed as it would apply to Claims 1-5 and 26-27 as amended herein.

Arendt discloses liquid glycol benzoate compositions which comprise a particular combination of C<sub>2</sub> and C<sub>3</sub> glycol esters such that the freezing point of this ester mixture is below the freezing point of the constituent esters. Such ester mixtures are said to be useful as plasticizers for polymers. Although primarily directed to combinations of benzoic esters (which are the only type of compositions exemplified in Arendt), Arendt does generally indicate that toluate esters can also be used. Arendt, however, does not disclose any particular source or purity level of the benzoic acid or toluic acid (or halides or anhydrides thereof) which can be used to make the Arendt ester mixtures. There is certainly no disclosure in Arendt of the transesterification reaction of C<sub>2</sub>-C<sub>3</sub> glycols with methyl-*p*-toluate or any mixtures of aromatic reactants which are enriched in methyl-*p*-toluate. Furthermore, no viscosity or volatility characteristics, even in general terms, are given for any of the Arendt ester mixtures.

It is respectfully submitted that Arendt fails to disclose at least one essential feature of the compositions of applicant's amended Claims 1-5 and 26-27. This is the

feature that the claimed ester mixture be prepared from a methyl-*p*-toluate enriched mixture, i.e., a mixture of methyl-*p*-toluate with other aromatic acids and esters such as are found in a process stream from the Witten process for making dimethyl terephthalate. It is the glycol transesterification reaction product obtained from glycols and this particular combination of aromatic reactants which applicant has found to have especially useful low viscosity and low volatility properties. The Arendt ester mixtures are simply not made in this specified way and accordingly would not be expected to have the same make-up, properties and characteristics as the toluate ester based compositions of applicant's amended Claims 1-5 and 26-27.

Given the foregoing considerations, it is clear that the Arendt patent does not directly anticipate applicant's presently presented Claims 1-5 and 26-27. Therefore, continued rejection of these claims as amended herein under 35 U.S.C. §102(b) over Arendt would be improper.

#### Section 103 Rejection

Claims 6-7 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentably obvious over Arendt in view of GB 947764 (cited as CAS Online Citation 60:69197, hereinafter "GB '764"). The Examiner contends that it would have been obvious to add "tall oil fatty acids" to the Arendt compositions in light of the GB '974 disclosure of soybean fatty acid derivatives in glycol benzoate plasticizers, to thereby realize applicant's claimed compositions. Such a rejection is respectfully traversed as it would apply to Claims 6-7 and 28 as amended herein.

GB '764 discloses a plasticized poly(vinyl chloride) composition which comprises dipropylene glycol benzoate and epoxidized soybean fatty acids along with a number of other ingredients. GB '764 does not disclose any resins plasticized with glycol toluate esters or unepoxidized tall oil fatty acids or natural oils.

It is submitted that while GB '764 might suggest the use of some kinds of fatty acid derivatives in combination with some kinds of aromatic acid esters in resin plasticizers, this secondary reference does not rectify the deficiencies in the teaching of Arendt with respect to the specific components of applicant's claimed compositions. GB '764 uses neither the same kinds of glycol ester nor the same kind of fatty acids or

derivatives thereof as are described in applicant's Claims 6, 7 and 28 as amended herein. It cannot therefore be properly concluded that the skilled artisan reading both Arendt and GB '764 together would obviously be lead to prepare the same kinds of compositions as described in the claims rejected over these two references.

Given all of the foregoing considerations, it is respectfully submitted that the reference combination of Arendt and GB '764 is not one which is properly said to suggest or render obvious the particular fatty acid/oil-containing toluate ester compositions of applicant's Claims 7, 6 and 28 as amended herein. Continued rejection of these amended claims under 35 U.S.C. §103(a) over Arendt in view of GB '764 would therefore be improper.

### **Conclusions**

Applicant has made an earnest effort to place her application in proper form and to distinguish her claimed invention from the applied prior art. WHEREFORE, reconsideration of this application, entry of the claim amendments presented herein, withdrawal of the claim rejections under 35 U.S.C. §§102, 103 and 112, and allowance of Claims 1-7 and 26-28 as amended, are all respectfully requested.

Any comments or questions concerning this application can be directed to the undersigned at the telephone number given below.

Respectfully submitted,

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